

## **REMARKS**

These remarks and the above amendments are responsive to the Office action dated September 10, 2004. Claims 54-75 are pending in the application. The Office action can be summarized as follows:

- Claims 54, 55, 57-62, 66, 68, 69, and 73-75 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,452,773 to Molday ("Molday").
- Claims 56, 63-65 and 67 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Molday in view of U.S. Patent No. 4,628,037 to Chagnon et al. ("Chagnon").
- Claims 50-72 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Molday in view of U.S. Patent No. 4,048,298 to Niswender ("Niswender").

Applicant traverses the rejections. In particular, applicant does not believe that the cited references or any other references teach or suggest a method of separating a target material from a liquid mixture as recited in the rejected claims. Nevertheless, to expedite issuance of a patent, applicant has amended independent claim 54 to more particularly point out and distinctly claim aspects of the invention, and dependent claims 57, 58, and 66-68 to provide for proper antecedent basis of all the elements of the claims. The amended claims now focus on a multi-step process of separating a target material from a liquid mixture, rather than reciting a process that includes selecting colloidal magnetizable particles prepared by a series of steps.

Applicant believes that the amended claims clearly embody significant differences between the claimed methods and the cited references. Specifically, the amended claims are directed to a multi-step process of separating a target material from a liquid mixture by forming and at least substantially purifying aggregates of

crystallites of a magnetizable metal oxide before coating the aggregates with a polysaccharide material. As previously submitted in applicant's response from August 20, 2004, these differences may have a number of advantages, including substantially increasing the fraction of magnetic material in each aggregate, thereby making the aggregate easier to separate from a liquid mixture by applying a magnetic field. Thus, for at least these reasons, applicant respectfully requests favorable consideration of the new claims, and prompt issuance of a Notice of Allowance.

### **Power of Attorney**

Applicant is submitting herewith a Power of Attorney appointing the practitioners (including the undersigned practitioner) at Kolisch Hartwell, P.C., USPTO Customer No. 23581, as his attorneys and agents.

### **Claim Rejections – 35 U.S.C. § 102 / 103**

Claims 54, 55, 57-62, 66, 68, 69, and 73-75 were rejected under 35 U.S.C. § 102(b) as anticipated by Molday. Specifically, the Examiner stated that the rejected claims recite:<sup>1</sup>

“a process (method of making the particle) within a process of using the particle. Thus, the method of making is not given any patentable weight because the end product is the same as that of the prior arts regardless of how it was made. The results of the process of using would be the same as those of the Molday reference.”

The Examiner seems to be stating that the claims recite a method of using a product-by-process, where the product is a magnetizable particle. The Examiner also seems to be stating that a magnetizable particle prepared by (A) forming and at least substantially purifying aggregates of two or more crystallites of a magnetizable metal oxide, (B)

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<sup>1</sup> Office Action, dated September 10, 2004, p. 7.

coating the formed and at least substantially purified aggregates with a polysaccharide material, and (C) treating the polysaccharide material so that it has a binding affinity for the target material, is unpatentable over Molday. If applicant has correctly interpreted the Examiner's arguments, the Examiner is rejecting the method claims by improperly disregarding the steps required to prepare magnetizable particles, based on her assessment of the patentability of a product (i.e., magnetizable particles). Applicant traverses these rejections.

The recited method is not directed to either a product-by-process, where the product is a magnetizable particle, or a method of producing a magnetizable particle. In fact, the Examiner previously restricted prosecution of a method of producing a magnetizable particle and a method for separating a target material from a liquid mixture using a target material.<sup>2</sup> Therefore, the patentability of a magnetizable particle, and of a method of producing a magnetizable particle, is not at issue in this application. Rather, applicant has elected to prosecute claims that recite a method of separating a target material from a liquid.<sup>3</sup> Regardless of the patentability of a magnetizable particle or a method of producing a magnetizable particle, the claimed method requires: (A) forming and at least substantially purifying aggregates of two or more crystallites of a magnetizable metal oxide; (B) coating the formed and at least substantially purified aggregates with a polysaccharide material; and (C) treating the polysaccharide material so that it has a binding affinity for the target material. Because the Examiner admittedly did not give these elements any patentable weight when she found the claims anticipated by Molday, applicant traverses the rejections.

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<sup>2</sup> See Office Action, dated May 9, 2003, p. 2.

<sup>3</sup> See Response, dated May 19, 2003.

Neither Molday nor any other reference of record teaches or suggests a method of separating a target material from a liquid mixture as recited in the rejected claims. Nevertheless, to expedite issuance of a patent, applicant has amended independent claim 54 to more particularly point out and distinctly claim aspects of the invention, and dependent claims 57, 58 and 66-68 to provide for proper antecedent basis of all the elements of the claims. Applicant's previous claims recited a process that included selecting colloidal magnetizable particles prepared by a series of steps. In contrast, the amended claims now focus on a multi-step method of separating a target material from a liquid mixture, without reciting a selecting step, while still illustrating the patentable differences between applicant's claimed methods and Molday. These differences include applicant's step(s) of forming and at least substantially purifying aggregates of crystallites of a magnetizable metal oxide before coating the aggregates with a polysaccharide material. These differences may have a number of advantages, as described below, including potentially substantially increasing the fraction of magnetic material in each aggregate, thereby making the aggregate easier to separate from a liquid mixture by applying a magnetic field.

Applicant's amended claims recite methods for separating a target material from a liquid mixture. These methods include the steps of: (A) forming and at least substantially purifying aggregates of two or more crystallites of a magnetizable metal oxide; (B) coating the formed and at least substantially purified aggregates with a polysaccharide material; (C) treating the coated aggregates so that the polysaccharide material has a binding affinity for the target material; (D) combining the treated aggregates with the liquid mixture containing the target material for a sufficient time for

the target material to bind to the polysaccharide material; (E) applying a magnetic field to the combination of the aggregates and the liquid mixture; and (F) separating the aggregates, including the target material bound thereto, from the liquid mixture, using the magnetic field. The process of forming and purifying aggregates before coating the aggregates reduces the likelihood that the aggregates will trap and/or be held together by coating material, since the aggregates exist prior to the addition of the coating material.

Molday, in contrast to applicant's claimed invention, discloses a "one-pot" method for preparing magnetic iron-dextran microspheres. Molday's method involves mixing iron salts (ferric and ferrous chlorides) and coating materials together to form magnetic iron-dextran microspheres.<sup>4</sup> The resulting particles are about 50% iron, by weight,<sup>5</sup> implying that they are about 30% dextran.<sup>6</sup> In contrast, the claimed methods involve forming and at least substantially purifying aggregates of crystallites of a magnetizable magnetic oxide, and then coating the formed and at least substantially purified aggregates with a polysaccharide material. The resulting particles may have less (potentially significantly less) dextran than Molday's particles. For example, in an embodiment of the claimed invention, the particles are about 15% dextran.<sup>7</sup> The twofold greater fraction of dextran in Molday's particles may arise because dextran is incorporated into and onto, rather than simply onto, Molday's particles. However,

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<sup>4</sup> See, e.g., Molday, column 8, lines 33-37.

<sup>5</sup> See, e.g., *id.* at column 11, lines 8-10.

<sup>6</sup> Fifty percent iron implies about 70%  $\text{Fe}_3\text{O}_4$ , which in turn implies about 30% dextran, all measured by weight.

<sup>7</sup> Particles produced in an embodiment of the claimed invention have about 0.25 mg dextran per mg iron, which implies that they have about 0.25 mg dextran per 1.43 mg  $\text{Fe}_2\text{O}_3$ , or about 15% dextran, measured by weight.

whatever its origin, the twofold greater fraction of dextran in Molday's particles implies that Molday's particles should be significantly less magnetic, weight-by-weight, and thus proportionally more difficult to separate with a magnetic field, than particles produced in the above-mentioned embodiment of applicant's claimed method.

In summary, independent claim 54 provides a method for separating a target material from a liquid mixture that is neither taught nor suggested by the art of record and that may provide significant advantages over the prior art. Thus, for at least these reasons, claim 54 is patentable over Molday and the other references of record. Claims 55-75 depend from and further limit claim 54 and so are patentable for at least the reasons that claim 54 is patentable.

Applicant believes that he has addressed all of the issues raised by the Examiner in the Office action dated September 10, 2004, and that the application currently is in condition for allowance. However, if the Examiner has any questions or comments, or if a telephone interview would advance prosecution of the application, the Examiner is encouraged to call applicant's undersigned attorney at the telephone number listed below.

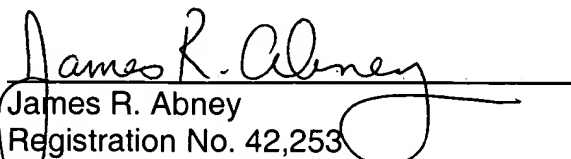
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Lisa Holstein

Respectfully submitted,

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